

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,039,067 B2
APPLICATION NO. : 09/917171
DATED : May 2, 2006
INVENTOR(S) : Lee Daniel Feinberg et al.

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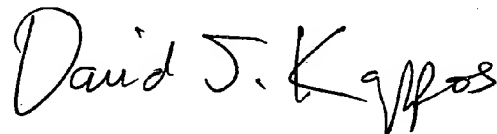
It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Delete the title page and substitute therefore the attached title page consisting of corrected illustrative figure.

Delete Drawing Sheet 4 of 7 and substitute therefore the attached Drawing Sheet 4 of 7.

Signed and Sealed this

Fifteenth Day of December, 2009

A handwritten signature in black ink that reads "David J. Kappos". The signature is written in a cursive, flowing style with a large initial 'D' and a stylized 'K'.

David J. Kappos
Director of the United States Patent and Trademark Office

(12) **United States Patent**
Feinberg et al.

(10) **Patent No.:** **US 7,039,067 B2**
(45) Date of Patent: **May 2, 2006**

(54) **METHODS AND SYSTEMS FOR HYBRID INTERFACES AND ARCHITECTURES FOR OPTICAL COMMUNICATIONS**

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(73) **Assignee:** **Dorsal Networks, Inc.**, Columbia, MD (US)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 861 days.

(21) **Appl. No.:** **09/917,171**

(22) **Filed:** **Jul. 30, 2001**

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(51) **Int. Cl.**
H04L 12/56 (2006.01)

(52) **U.S. Cl.** **370/468; 370/535**

(58) **Field of Classification Search** **370/464, 370/465, 468, 498, 535, 536, 537, 538; 398/54, 398/56**

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,764,405 A 6/1998 Alphonsus
 5,912,755 A 6/1999 Bergano
 5,912,761 A 6/1999 Jander et al.
 5,938,309 A 8/1999 Taylor
 5,946,119 A 8/1999 Bergano et al.
 5,966,206 A 10/1999 Jander

6,014,479 A 1/2000 Darcie
 6,057,950 A 5/2000 Bergano
 6,084,694 A * 7/2000 Milton et al. 398/83
 6,147,796 A 11/2000 Ma et al.
 6,304,351 B1 10/2001 Pedersen
 6,310,709 B1 10/2001 Bergano
 6,327,250 B1 12/2001 Chen et al.
 6,341,023 B1 1/2002 Puc
 6,433,904 B1 * 8/2002 Swanson et al. 398/91
 6,532,320 B1 * 3/2003 Kikuchi et al. 385/24

OTHER PUBLICATIONS

Gadiraaju et al. "Channel Protection Switching in WDM Mesh Networks". IEEE, May 29-31, 2001. pp. 26-30.*
 Dick et al. "Configurable Logic for Digital Communications: Some Singal Processing Perspectives". IEEE, Aug. 1999. pp. 107-111.*
 Afferton et al. "Optical Networking -- A Multi-service Global Carrier's View". IEEE, Nov. 8-11, 1999. pp. 399-400.*
 P.K. Runge et al., "AT&T Optical Amplifier Systems" AT&T Bell Laboratories Pub., pp. 72-77.

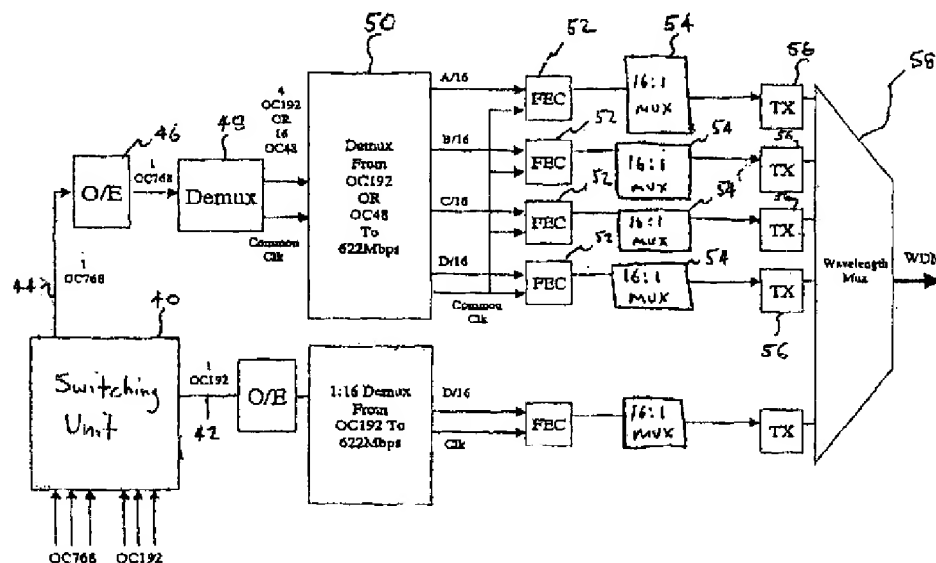
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(57) **ABSTRACT**

A hybrid interface for handling different types of data streams is disclosed. Both OC192 and OC768 data streams can be transported between terrestrial and submarine systems using hybrid interfaces. Examples include processing branches that use common FEC units, multiplexers, demultiplexers, transmitters and receivers for both types of data streams. WDM channels are allocated in groups for OC768 data stream handling. Time misalignment between received channels within a group is identified and compensated.

59 Claims, 7 Drawing Sheets



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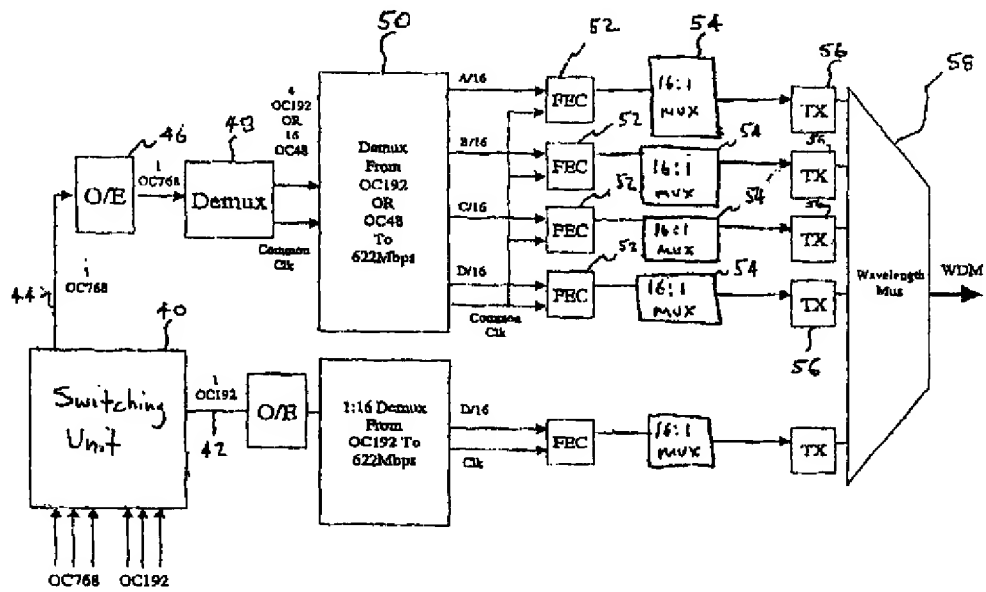


Figure 4